

NOTES ON NEARCTIC TABANINÆ. PART III.
THE *TABANUS LINEOLA* COMPLEX¹By Cornelius B. Philip
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Among the taxonomic problems needing review, anticipatory to preparation of a catalog of Nearctic species of Tabanidæ, is the recurrent question of variation in the common *Tabanus lineola* Fabr. Relatives of this species with pale abdominal stripes, lately have been referred to *Neotabanus* Lutz (not Ricardo) (synonym, *Tæniotabanus* Kröber), although the group has not been considered of generic rank by Kröber (1934), Stone (1938) or Bequaert (1940b). Osten Sacken early pointed out, and Bequaert (1940a) reiterated "the *Tabanus* with trivittate abdomens . . . are among the most difficult insects to deal with."

Hine (1906) attempted analysis of North American species "with a uniform middorsal stripe . . ." Tinctorially, also included were such species as *acutus* Bigot and the *nigro-vittatus* relatives with unbanded, unextended eyes. There is little structurally to define *Neotabanus*, and *nigro-vittatus* was also keyed with *lineola* in this category by Bequaert (1940b). The name might have more taxonomic utility if restricted to the close *lineola* relatives having the characteristic, multiple eye-banding, and extended outer angles of the eyes (most noticeable in the females) in addition to the abdominal stripes. Such species as *T. productus* Hine and *T. texanus* Hine form troublesome intergrades. The former has the characteristic eye-banding, laterally produced head, and a somewhat *dorsiger*-like abdominal pattern which belie the *Stenotabanus*-like antennæ and wing spurs; *texanus* has a single, narrow purple eye band like *nigrovittatus*. Some *T. sagax* O. S. and rubbed

¹The studies on which this paper is based were completed at the Museum of Comparative Zoology, Harvard University, during tenure of a Fellowship from the John Simon Guggenheim Foundation.

specimens of a few other species also complicate reliance on the abdominal stripes, so that maintenance of *Neotabanus* even as a subgenus appears to be only a matter of arbitrary taxonomic convenience as discussed elsewhere (Philip, 1941). Those undertaking assignment of *Neotabanus*, furthermore, will be faced with clarification of the puzzling description of the head of *trilineatus* Latr., the genotype species.

The Neotropical fauna of this group shows more variation than the Nearctic, as reflected in the numerous specific names proposed by various students particularly in Europe. Only a few of these names are recognizable at present. Bequaert (1940b) has provided useful copies of some of these scattered descriptions, while Kröber reports personal study of many of the European types. Until all the pertinent types can further be studied by a competent student, particularly those of Bellardi, any review such as the present will have to rest on tentative opinions, interpretations, and comparison of available materials, using both sexes wherever possible.

The Nearctic *T. lineola* of authors is a variable complex, and material at hand appears to provide at least 5 forms and possibly more if sexes could be correctly associated. Were it not for evidence of differing males, these forms in part would justify Bequaert's opinion that neither the color of the femora and scutellum, nor the "appendix to the fork of the third vein offer reliable specific characters." An enumeration of these variants will show the necessity for some qualification of this opinion, however. The shapes of palpi and colors of areas of enlarged facets in identical series of males are too variable unfortunately, to be of much supplemental, diagnostic aid.

Independently, Fairchild (unpublished) has come to conclusions regarding significant, diagnostic characters in the group very close to those of the author. Since a consideration of specific trends in both the Nearctic and Neotropical faunæ is necessary for a rational treatment of either, it is a pleasure to acknowledge personal collaboration with Fairchild in arriving at an agreement on the systematic arrangement in best accord with present, available information. An unfortunate paucity of information regarding the inter-

mediate Mexican fauna hinders complete clarification of overlapping.

Until the question of specific and subspecific or varietal status of certain forms and groups can be more definitely established, and the doubt removed regarding the application of certain names, there is little to be gained in questioning whether *occidentalis* L. should replace *lineola* Fabr. as here recognized or to what form this early name should apply.

Tabanus lineola Fabr. *s. str.* The original description is inadequate in certain crucial characters, and unfortunately, the probable type is represented at the Kiel Museum by only the thorax, wings, and first 2 abdominal segments. From among a series of forwarded specimens, Dr. O. Schröder selected one with a reddish margined scutellum as closest to what remains of the type. The legs were originally described as "pedes nigri tibiis ferrugineis", indicating black femora. If the type really had a red scutellum originally, this would best fit *schwardti* below, and Maquart's (1838) reference to hairy eyes in the male suggests presence of this form among early material. But since Fabricius described the prescutal lobes as "ferrugineo" without mentioning the scutellum, the brown now present may be due to a translucency sometimes seen in worn, and pest-destroyed specimens where only the integument remains. In the absence of certainty, it seems best for the present not to change the figured conception of Stone and Bequaert, though the discussions of both were more inclusive than their figures indicate.

What I take to be the males of this form from Michigan and Arkansas (reared by Schwardt) have the areas of enlarged facets in the upper $\frac{2}{3}$, pale buff grey, hairs very short and sparse ("ostensibly bare" for key purposes), the thorax and scutellum subshiny cinereous, the vestiture sparse, all 3 pairs of femora infuscated to the knees, the pale middorsal stripes narrow, the sublateral yellow ones, reduced and broken, the intervals extensive brown, not black, and giving a suggestion of the suffused, less contrasting pattern seen in *scutellaris* described below. The abdominal stripes of males from the Gulf Coast are more contrasting and regular.

The female has a convergent, narrow front, its height

about 6 to 7 times its basal width (in the key the frontal index has been expanded to 1:5 to include the questioned group discussed later). The scutellum, fore and much of the hind femora are blackish or cinereous, the mid-pair are variable. The abdomen is usually reddish laterally, especially in worn specimens, but in a considerable series from Michigan, Ontario and New York, a melanistic variation occurs which resembles the Neotropical *plangens* Walk. (? *modestus* Wied.) except that the wings of the latter are distinctly fumose especially along the veins, the dorsum of the thorax has a more metallic sheen due to irridescent hairs, and the hairs on the entire fore femora are deep black.

Stone informs me specimens of this form in the National Museum are from Mich., Ohio, Me., Conn., N. Y., Pa., Del., D. C., Md., Va., and N. C. I have seen it also from Ont., Mass., Ga., Fla., Tenn., and La.; a single but undoubted specimen bears an early label of Douglas Co., Kans., which may be a mislabel in the absence of any others in a large amount of recent material from that state. It appears to be most abundant along the Atlantic Coast. I also have seen a typical female in Bequaert's collection from Cuba. Since *T. bellardii* Szil. from Cuba is described with "front three and a half times as broad as its lower breadth" and "brown antealar swelling and scutellum", Bequaert (1940b) must be mistaken in this synonymy. The description of *T. cubanus* Szil. is inadequate for judgment but the "furca with a sharp appendix" and comparison with *trilineatus* suggest a Neotropical relationship. In all the Nearctic specimens of the various forms I have seen a short spur on one wing of only one specimen. The "carneis" scutellum and posterior legs preclude the synonymy of *T. carneus* Bell. On the other hand, the front of the type of *T. commixtus* Walk. from Mexico in the British Museum is said by Oldroyd to agree exactly with Stone's figures of *lineola* and, since the femora are blackish, the only difference in the description is the yellow rather than white middorsal stripe. The actual occurrence of the typical form in modern Mexico remains to be verified, however.

T. lineola subsp. *scutellaris* Wlk. Possibly the most familiar to North American students is this form with reddish scutellum and femora, frontal index (♀) 1: 3½-4½,

eyes of the male with very fine, scattered hairs (also "ostensibly bare"), the slightly enlarged facets confined to the upper half and not flattened on the disc, and the male abdomen with a brownish suffusion, the stripes somewhat obscured. This is the male described by Osten Sacken (1876) and both sexes by Hine (1903); it also is the form reared by the author (1931) in Minnesota and later in Montana, as well as probable by Hart (1896). The sublateral reddish or yellow, abdominal lines are usually irregular, composed of a series of trapezoidal or rhomboidal, connecting spots. In a series of pallid California specimens of both sexes, these lines are often obliterated, the lateral yellow being continuous onto the venter. In occasional Northern specimens irregular cinereous spurs or shadows may show basally on the femora while in others even the fore coxæ are yellowish. The inner faces of the fore femora are customarily shining brown with black pile, but the outer surface is pale pollinose and pilose.

Though the characters of *scutellaris* would suggest specific distinction from typical *lineola* and even its close Nearctic variants, intergradation of *stenocephalus* and certain other Neotropical forms prevent more than subspecific separation at present, as will be discussed by Fairchild in a future communication.

The type of *scutellaris* is now not present in either the British or Hope Museums with other Saunders types. The described reddish scutellum and "tawny" legs are in agreement with this form which Stone (1938) recognized as a variety of *lineola*. The type data "Bolton, North America" probably refer to a person in part, not a locality according to Oldroyd as some other Saunders specimens carry the label "D. Bolton".

It occurs entirely across the continent in southern Canada and the northern states, the southern records including D. C., W. Va., Ohio, Ill., Iowa, Kan., Colo., Utah, Nev., and Calif. as far south as Los Angeles. I have seen a female each from Utah and Montana with femora somewhat infuscated approaching the following.

T. vittiger subsp. **schwardti** nov.

The writer originally intended to retain this provisionally

under *lineola*, but Fairchild has indicated the evident relationship of this and *nippontucki* below with Neotropical variants of which *vittiger* Thomsen appears to be the prior name, although no males yet are available from the Galapagos Islands.

This is the form chiefly reared by Schwardt (1931), and at once distinguished from *scutellaris* males by the large head with much enlarged upper eye facets occupying fully three quarters of the total eye area, and with more pronounced hairs. Furthermore, the palpi are often less blunt and abdominal pattern more contrasting like the females; the fore femora and to a less extent the hind and mid pairs are infuscated. Except for such infuscation of the femora, the females closely resemble those of *scutellaris*. For this reason, the male which is the most distinctive sex is used as type.

Holotype ♂, 12.5 mm. Area of enlarged facets chocolate brown (yellow in some paratypes), flattened across disc, hairs distinct, and more dense than in typical *lineola*, vertical tubercle small, even with upper eye level, brownish pilose. Face white, palpi creamy with white and occasional black hairs, blunt apically (pointed in many paratypes). Antenna red, annuli black, first segment not unusually swollen, plate obtuse angulate and very moderately excavated. Thorax quite hirsute, including some pale purplish, appressed hairs dorsally and the usual, rather indistinct lines; posterior half of the scutellum reddish. Wings hyaline, no stump. Fore femora, basal two thirds of hind, one fourth of mid-femora, and distal half of fore tibiae and tarsi cinereous to blackish. Abdominal stripes distinct and contrasting, the median even and white, the sub-lateral irregular and yellow, the 4 intervals dark brown rather than black. Venter yellowish with dusky spots in the middle of the first 2 sternites and edges of all; black hairs only on last two.

Allotype ♀, 13 mm. In essential agreement with the holotype except for the usual sexual characters. Eyes extended laterally and the characteristic eye pattern (relaxed) usual for the group, front subparallel in upper third, convergent below, index 1: 4.8, the basal callosity very deep brown, quadrangular, a little taller than wide, the median callus small and hardly connected. The antennal plate nar-

rower and browner distally, the thoracic lines a little more distinct, the dark abdominal lines blacker posteriorly than in the holotype.

Knoxville, Tenn., Sept. 20 (♂) and 25 (♀), 1934. In light trap. In the collection of the author through kindness of W. W. Stanley.

Paratypes.—16 ♂, 16 ♀, Fayetteville and Washington Co., Ark., (reared), H. H. Schwardt; ♀, Drew Co., Ark., Aug. 20, 1928, "W. R. H."; ♀, Ark. Co., Ark., July 18, 1928, D. Isley; 2 ♀, Wash. Co., Ark., May 31 and June 10, 1929, D. Isley; ♀, Hunt, Ariz., Aug. 28, 1919; ♀, New Boston, Tex., May 15, 1906, C. R. Jones; ♀, College Station, Texas, Oct. 19, 1919, H. J. Reinhard; 2 ♀, Brownsville, Texas, June and July, F. H. Snow; ♂, 3 ♀, State College, Miss., Apr. 12, May 7, 11, and 17, 1939, Smith, Jackson, Macon, and Shivers; ♀, Everglades Exp. Sta., Fla., July 10, 1938, W. C. Stehr; ♀, Atlanta, Ga., June 17, 1935, P. W. Fattig; 2 ♂, Falls Church and Great Falls, Va., June 8 and 30, 1917, C. T. Greene; ♀, Wash., D. C., June 25, 1913, R. C. Shannon; ♀, Beltsville, Md., Sept. 3, 1916, W. L. McAtee; ♂, Plummers Is., Md., Mar. 9, 1905, at light, H. S. Barber; ♂, ♀, Newark and Dana Landing, Del., July 5, 1938 and June 13, 1935, Donald MacCreary; ♀, Melrose Highlands, Mass., July 8, 1908, D. H. Clemons; 2 ♂, Wooster, and Marietta, Ohio, July 23 and Aug. 4, 1938, C. H. Martin; 2 ♂, 5 ♀, Montgomery Co., Kan. 798', 1916, R. H. Beamer; 4 ♂, 3 ♀, Kiowa Co., Kans., July 1-5, 1923, R. H. Beamer and C. L. Woodruff. In the collections of the U. S. Nat'l. Mus., Calif. Acad. of Sciences, Mus. Comp. Zool., Ohio State Museum, Universities of Arkansas, Mich., and Kan., L. L. Peckuman, G. B. Fairchild, H. H. Schwardt, T. H. G. Aitken and the author.

In reared or fresh specimens, the vestiture of the scutellum sometimes obscures the reddish margin, but seldom completely.

Since Schwardt (1931, 1936 and fig. of egg mass) observed 2 generations in Arkansas, it may well be that there are biological differences in different species of the *lineola* group. *Scutellaris* and *lineola* s. str. are the only other Nearctic forms which have been reared; the data are too few for comparison, although the adults have a similar long seasonal occurrence in Calif. in contradistinction to the

following form (*nippontucki*) in that area. Pupal differences have not been discernable.

T. vittiger subsp. **nippontucki** subsp. nov.²

As indicated above, this is a southwestern variant which, in both sexes, resembles *schwardti* but is much more pallid and frosty appearing, the femora not usually infuscated basally, and the thoracic lines more obscure.

Holotype, ♂, 12.5 mm. Head large, eyes brown, upper area of enlarged facets extensive occupying $\frac{3}{4}$ the total area, distinctly hairy, vertical tubercle narrow and reduced. Frontal triangle yellow pollinose extending onto the cheeks along the eye margins. Remainder of face and cheeks whitish pollinose and pilose. Palpi pale creamy, whitish pilose, the apical segments plump and with a decurved nipple. Antennæ red, scapes not enlarged. Thorax frosty pollinose and pilose, a little darker above with only suggestions of 2 sublateral dorsal lines; prescutal lobes and apical half of scutellum pale reddish. Wings hyaline, venation normal; halteres pale yellow darker on the stem. Front legs with inner faces of femora, apical half of fore tibiæ, and all tarsi dark brown, remainder of legs pale yellowish, the hind tibial fringe predominantly whitish on the basal $\frac{2}{3}$. Abdomen pale yellowish above and below the dark mesal pair of lines faded brown, the sublateral ones obsolescent, with few black hairs in evidence. The mid-stripe broad, and widened on each hind border. The sublateral pale lines indistinctly step-like and irregular.

Westmoreland, Calif., July 20, 1933, M. Cazier. In the U. S. Nat'l. Museum No. 56087.

Allotype, ♀ 12 mm. Head and its appendage shapes and eye pattern of the usual *lineola* type, frontal index 1:4.5, convergent below but parallel in the upper third. Callosity brown, narrowly separated from the eye margins, the median callosity short and narrowly joined to the basal. Subcallus yellow pollinose, face and cheeks whitish pilose and

²The unorthodox name was applied in manuscript on Dec. 8, 1941 (the day after "Pearl Harbor"), and is of barbaric derivation to commemorate recent events associated with "Nippon", and a style of sneak air attack used even by horseflies.

pollinose. Antennæ red, scapes normal. Palpi pale yellow, attenuated, covered with pale hairs, and a few black ones on the apical segment. Thorax pale yellowish pilose and pollinose above with 3 indistinct dark lines posteriorly, scutellum broadly pale reddish behind; pleuræ, chest and coxæ whitish pilose and pollinose. Wings hyaline, venation normal. Halteres pale yellow. Legs pale reddish, fore pair brown on the inner faces of the femora and blackish beyond the middle of the tibiæ, the hind-tibial fringe predominantly white on the basal two thirds. Abdomen very pale, inconspicuously gray and reddish lined above, the pale middorsal line widened on each incisure, the sublateral gray lines irregular in a *shwardti*-like arrangement. Venter pale reddish, with an indistinct, darker, mid-ventral band in certain lights; black hairs only on terminal sternite.

Westmoreland, Calif., 5-20-31, R. M. and G. E. Bohart. In the collection of the author through courtesy of Dr. T. H. G. Aitken.

Paratypes—3 ♂, Westmoreland, Calif., July 20, 1933, M. Cazier; ♂, same data as allotype but May 15; 2 ♂, Coachella, Calif., May 13, 1917, E. P. Van Duzee; ♂, ♀, Brawley, Imperial Co., Calif., Aug. 9, 1914, J. C. Bradley; ♀, same data but Aug. 10; 3 ♂, same place May, 1911, June 1 and 6, 1912, J. C. Bridwell; ♂, El Centro, Calif., June 25, 1917 (Bishopp No. 7392); ♂, El Centro, Calif., April; 4 ♂, ♀, Sommerton, Ariz., June 2, 1938, C. C. Deonier (Bishopp No. 27,815); ♂, Yuma, Ariz., April, 1937, R. M. and G. E. Bohart; ♂, Ehrenberg, Ariz., Aug. 25, 1938, F. H. Parker. In the collections of the U. S. Nat'l Museum, Museum of Comp. Zoology, T. H. G. Aitken, G. B. Fairchild, J. C. Bequaert, and the author. Part of these males were assigned to *T. truquii* Bell. by Stone (1938).

There is some variation in size, and palpal shapes, while the upper eye facets in some males are contrasting yellow rather than brown. Four males from New Mexico and Texas appear to belong here because of the bleached body pattern, but approach *shwardti* in having darker shadows on the bases of the hind femora.

In south central California, where this intermingles with *scutellaris*, the latter also is somewhat pallid, and the females are very close, but separated as given in the key. The

writer hesitated to describe this variant because of its likely extension into Mexico and the possible application of an earlier name. Lack of adequate Mexican material gives no assurance that this is not the case, but the form is distinct from any Neotropical material studied by me or by Fairchild.

Discovery of the correct male of *vittiger* is needed to justify assignment of *nippontucki* as a subspecies. The fronts of the females and femoral colors are in agreement, but the wider, all reddish antennæ, whitish hind tibial fringe, and different abdominal pattern with wide middorsal stripe (widened on the incisures somewhat as in *maya* Beq. and some other Neotropical species) may set this apart as more complete information is forthcoming. These remarks apply equally to differentiation from *guatemalanus* Hine which Fairchild also associates with *vittiger*.

T. amplifrons Kröber. The female from Brownsville, Texas, assigned to *T. truquii* Bell. by Stone (1938) has the parallel-sided front, small yellowish callosity, dark scutellum, reddish femora, and other characters of Kröber's species, as well as of Hine's (1906) Guatemala *truquii*, and certain other Neotropical specimens recognized by Fairchild. The associated males from Brownsville, Uvalde, and Galveston have hairy eyes with fairly uniform facets, but they show the peculiar contrast to the females of dark femora and somewhat enlarged scapes of Bequaert's (1940b) *T. trilineatus* and Hine's *T. truquii*. These sex differences are not in accord with other species of the *lineola* complex.

I have also seen a confusing series of males from Galveston which differ only in having uniformly reddish legs and small antennal scapes. Whether these belong here or are a different variant is uncertain at present.

There appears also a good possibility that an earlier name from among the now unplaced Neotropical ones eventually may be found to apply.

Separation of *amplifrons*, *scutellaris*, *schwardti*, and *nippontucki* still leaves a somewhat heterogeneous group of flies in *lineola s. lat.* which are susceptible of only unsatisfactory analysis in the absence (1) of unquestioned association of males with divergent females, (2) of the real

identity in the restricted sense of Bellardi's³ and other pertinent types, and (3) of definite information of what extension from the Neotropical fauna has taken place through Mexico. In other words, while additional variants in the southern United States are still evident, any further restriction of Nearctic "lineola" at the present time involves the danger of confusing, rather than clarifying the complex, except to point out such elements for reference for the future reviewer when adequate information is available. Among such observed elements divergent from *lineola s. str.* may be mentioned the following.

Tabanus truquii Bell. has been variously applied to hairy-eyed variants found in Texas and the Southwest. The males were considered by Stone (1938) and Bequaert (1940b) to have areas of greatly enlarged facets, and Bellardi describes eyes of both *truquii* and *carneus* as "superne minute, inferne minutissime *reticulatis*", hairy in the former with dark scutellum and femora, but bare in *carneus* with flesh colored scutellum and posterior legs (his statement "tibiarum basi nigris" is not clear). *Schwardti* appears closest to *truquii* except for the red scutellum and its unknown occurrence in Mexico. On the other hand, since the relative differentiation of large and small facets in Bellardi's description is still speculative, *truquii* might also apply to *amplifrons* which must extend through Mexico. The question of application of this name to any Nearctic form will have to await further clarification of the Neotropical species, but it cannot apply to an immediate variant of *lineola s. str.* as also recognized by others.

Less divergent is the large, yellowish, evenly lined variant seen from Miss., La., and Tex., labelled and figured by Hine (1906, 1907) as *T. quinquevittatus* Wied. The name cannot apply as discussed later. The hairs and pollinosity of the venters and middorsal stripes are much more intensely yellow than in any other form. The fronts of the females are relatively wide, the eye facets of the males are markedly differentiated but the hairs reduced; the scutellums and femora are dark. While the wide fronts undoubtedly support tinctorial separation from typical *lineola*, the uncertain

³No response regarding Bellardi's types was elicited from the Turin Museum on repeated requests in prewar correspondence.

position of a certain intermediate specimens and possible application of some Neotropical name make it inadvisable to provide a name for this as yet, although its distinctness tinctorially is as marked as certain species now differentiated from *nigrovittatus* for example.

Questionably associated with the typical form is a considerable series of flies from Florida and neighboring states, the females of which have slightly wider fronts (about 1:5) and almost square through small callosities. The sides of the abdomen are often broadly reddish, the lateral dark stripes missing or obsolescent. The males of this and the typical form differ only in the regularity and width of the abdominal stripes, particularly the sublateral ones, duller pollinose thoracic dorsums, and possibly greater extent of the enlarged facets.

A portion of the complex thus still remains in unsatisfactory condition with no immediate hope of clarification, but it is confidently believed the recognition and separation of the preceding species and subspecies will at least narrow the problem. A key is here offered, not only to separate these recognized forms, but to call attention to other problematic variants for at least a part of which names may already be available when the Neotropical relatives have been adequately reviewed.

- | | |
|---|---|
| 1. Males | 2 |
| Females | 8 |
| 2. Scutellum and thorax concolorous, dark | 3 |
| Scutellum reddish on the posterior margin | 6 |
| 3. Upper eye facets markedly enlarged, glabrous or
imperceptibly hairy | 4 |
| Upper eye facets but little enlarged, normally plain-
ly hairy (Texas) | 5 |
| 4. Middorsal abdominal stripe chalky white | |
| <i>lineola</i> Fabr. | |
| Middorsal and sublateral stripes yellow.. <i>lineola</i> subsp.? | |
| 5. Femora infuscated; scape somewhat enlarged | |
| <i>amplifrons</i> Kröb | |

- Legs concolorous, reddish; scape normal sp.?
6. Upper eye facets little differentiated, bare under a hand lens; legs predominantly reddish
 *lineola* subsp. *scutellaris* Wlk.
 Upper eye facets much enlarged, plainly hairy; legs variable 7
7. Femora of at least fore and hind legs predominantly infuscated; body colors contrasting
 *vittiger* subsp. *schwardti* nov
 Legs, at least 2 hind pairs, concolorous pallid, and faded; southwestern flies
 *vittiger* subsp. *nippontucki* nov.
8. Scutellum and thorax concolorous, dark 9
 Scutellum reddish on posterior margin; sublateral abdominal stripes markedly irregular 11
9. Front narrow, height 5 to 7 times its basal width *lineola* Fabr
 Front broader, seldom more than 1: 4.5 10
10. Frontal margins parallel, index about 1:4; sublateral stripes irregular *amplifrons* Kröb.
 Front convergent below, index 1: 3.5 to 4.5; sublateral stripes mostly even and regular, or lateral dark lines missing sp. or subsp.?
11. Legs predominantly reddish 12
 Femora of at least fore and hind pair infuscated or cinereous *vittiger* subsp. *schwardti* nov.
12. Body markings contrasting; outer hind-tibial fringe mostly black; front usually evenly convergent from vertex *lineola* subsp. *scutellaris* Wlk.
 Body color faded in appearance, the middorsal stripe not especially paler than the sublateral ones; hind-tibial fringe mostly white; frontal margins rather bowed in the middle
 *vittiger* subsp. *nippontucki* nov.

T. quinquevittatus Wied. Discussion of this species is here appended since it has been considered as one of the *lineola* group although the writer disagrees with this assignment in the restricted sense. The type female now in the Vienna Museum, together with the type male and “?” female of *costalis* Wied. were loaned to me through courtesy of Dr. Max. Beier. All were greased and the venter of the male completely obscured by an extraneous coating, but the natural condition was nicely restored by a cleaning in acetate. The “? *costalis*” female is *lineola*-like with clear wings and the entire antennæ and hind femora reddish, the front narrow as in the typical form, but not being a type cannot have nomenclatorial influence, in spite of 2 such labels in different hands on the specimen. Doubtless the “Savannah” ♂ referred to by Osten Sacken (1878, p. 228) as *quinquevittatus* was confused with the *costalis* type.

After cleaning of the two types, it is obvious they are conspecific with *vicarius* Walk. (1848, as considered by Stone (1938)). This would place *quinquevittatus* as the prior name for this common species, if the “type” is Wiedemann’s original specimen. In all points including size, the original Latin description agrees with this better than with a small *lineola*-like specimen to which complex Hine and Stone questionably referred the name. Omitted reference to a yellow costal cell cannot, however, be inferred by his comparison of the wing with “*T. dorsigero*” which supposedly has entirely hyaline wings. It is doubtful if even so careful a student as Wiedemann could have been expected to associate the sexes of his specimens seven years apart in their original condition.

The chief doubt on the authenticity of this specimen, however, is the locality which is written on 2 of the 3 labels as “Savannah” with no mention of the published reference “Mexico”. Dr. Beier assures me that the original labels and specimen have remained associated, and that “Savannah” is the locality entered in the Museum “genannte Buch”, so that one is led to question if Wiedemann may not have thought he was publishing the country in which Savannah was located at this early date. The geography of North America over a century ago, and especially the extent of Mexico, was quite different than it is today. In consequence

of, rather than in spite of, Osten Sacken's remarks (pp. xv and 229) on the Wiedemann types, I am inclined to agree that this must be the original specimen. There is some satisfaction in returning the species to the excellent dipterist by whom it was first recognized, and thus obviating use of another of the inadequately described Walkerian names which Osten Sacken considered so distasteful.

The synonymy therefore includes *costalis* Wied. (not Lichtenstein), *vicarius* Walk. (partim), *baltimorensis* Macq., and *floridanus* Szil.

Structurally indistinguishable from the species are *nigrovittatus* Macq., *fuscicostatus* Hine, and *mularis* Stone, so that differentiation depends on tinctorial characters—chiefly the intensity of yellowing of the callosity, palpi, face, pleuræ and costal cells, and differences in the abdominal pattern. Variations in these characters make some specimens difficult to assign, and the situation is somewhat analogous to the *lineola* complex without the structural differences in the males for support of separation. Variation in distribution of black and faint to more prominent sub-lateral red on the abdomen of certain specimens suggests that *mularis* may be a melanistic phase of *quinquevittatus*.

SUMMARY

The *Tabanus lineola* complex in Nearctic America is discussed, and the following forms recognized: *lineola* Fabr. s. str. and subsp. *scutellaris* Wlk., *T. vittiger* subsp. *schwardti* nov. and *nippontucki* nov., and *T. amplifrons* Kröb. For an adequate conception of these, associated males were essential. *T. quinquevittatus* Wied. is considered the prior name for *T. costalis* Wied. (not Licht.) and *T. vicarius* Wlk., thus removing it from the *lineola* complex.

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CORRECTION

In *Psyche*, vol. 48, p. 124, line 25, "motor fibers" should read "**motor association fibers.**"